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ABSTRACT

Understanding how people choose their work and educational environments and the dynamics that lead to satisfaction in these environments is critical to optimizing productivity and self actualization. The Strong Interest Inventory and the Social Skills Inventory were administered to 113 undergraduates to test the hypothesis that social types (Social, Enterprising, and Artistic) would have vis-a-vis task oriented types (Realistic, Investigative, and Artistic) strengths in the social skills needed to solve problems via social mechanisms, but no differences would be found on other social skills. It was found that the social types did indeed have relative strengths in those social skills related to social coping mechanisms. In addition to the aforementioned study, a qualitative study involving two academic chemistry laboratory groups was conducted to characterize the nature of the social interactions that are present in task oriented environments. The results revealed: (1) the members of the group were task oriented types; (2) the members expressed needs for social support and social interactions; (3) the members had below average skills in the social skills needed for social coping strategies; (4) the density of social interactions was relatively high; and (5) conflicts were solved via task solution rather than via social mechanisms. (ZWH)

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Social Interaction in Science Environments

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Running Head: Social Skills and Social Environments

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Abstract

Understanding how people choose their work and educational environments and the dynamics that lead to satisfaction in these environments is critical to optimizing productivity and self actualization. It has been hypothesized that the mechanism by which persons select environments involves the nature of the social interactions generated in the environments. To examine the nature of social interactions in various environments, two studies were conducted. The first study tested the hypothesis that social types (Social, Enterprising, and Artistic in Holland's theory) would have vis-a-vis task oriented types (Realistic, Investigative, and Artistic) strengths in the social skills needed to solve problems via social mechanisms, but no differences would be found on other social skills. The Strong Interest Inventory and the Social Skills Inventory were administered to 113 undergraduates and it was found that the social types did indeed have relative strengths in those social skills related to social coping mechanisms. The second study was a qualitative study of two academic chemistry laboratory groups (containing a professor, one or more post-docs, and several graduate students). The purpose of this study was to characterize the nature of the social interactions that are present in task oriented environments. This study involved administering three paper and pencil inventories, interviewing group members, and observing interactions in group meetings and in various lab settings. The findings of this study were that (a) as expected, the members of these group were task oriented types (primarily IR), (b) the members expressed needs for social support and social interactions, (c) the members had below average skills in the social skills needed for social coping strategies, (d) the density of social interactions was relatively high, and (e) conflicts were solved via task solution rather than via social mechanisms, regardless of whether the situation was task or relationship oriented.

Social Interaction in Science Environments

Understanding how people choose their work and educational environments and the dynamics that lead to satisfaction in these environments is critical to optimizing productivity and self actualization. A perspicuous theory of career choice is Holland's (1992) theory of person-environment fit. Essentially this theory postulates six personality types (realistic [R], investigative [I], artistic [A], social [S], enterprising [E], and conventional [C]) and six environments (with the same descriptors R, I, A, S, E, and C). The theory predicts, and hundreds of studies have confirmed (Holland, 1992, Spokane, 1985), that people seek environments that are compatible with their abilities, allow them to express their attitudes and values, and contain interesting tasks. That is, a person of a given personality type will choose and feel most satisfied in the corresponding environment.

Although Holland's theory is well specified at the level of choice and satisfaction, it is less clear how the dynamics of choice and resulting degree of satisfaction operate at the person level. Certainly, people choose to enter and leave vocational situations and that some of these situations produce more satisfaction for the person than others. The question remains as to what characteristics of the situation lead to the decision to enter or exit and result in variation in satisfaction.

Although an environment contains elements related to physical properties, Schnieder (1987) made the argument that the critical factor in any work environment is the nature of the people who inhabit the environment and the way in which they behave. That is, the environment is a function of the persons and their behavior-- $E = f(P,B)$. Schnieder's position is not incompatible with Holland's because Holland defined situations in terms of the personalities of the persons in those environments. For example, an academic chemistry

laboratory group is an investigate (I) environment because the professor, post-docs, and graduate students in the group are I types. According to Schnieder (1987), a social (S) type would feel uncomfortable with the laboratory group regardless of whether they were doing chemistry in the laboratory or interacting in another setting because the environment is postulated to be a function of the social interactions rather than the physical setting or the work tasks themselves:

> My hypothesis is that there is no attribute of a human setting (the kind we are interested in) that is caused by other than human behavior and that humans in different settings literally create different kinds of settings by their behaviors....Implicit in this definition of environments is the idea that it is the person characteristics that define behavior. Since person characteristics define what happens in a setting, it becomes clear they also determine the physical setting, the organizational structures and policies, and the social climate. (pp. 355-356).

Presumably, the interpersonal relations of individuals of a given personality will differ systematically from the interpersonal relations of individuals of a different personality, thereby constructing social environments that are unique to the personality types who inhabit those environments. In the context of Holland's theory, if the interpersonal relations between individuals of the same Holland code transmit the environment to others considering choosing or attempting to join, then there should be some identifiable differences in the social environments produced by groups formed of such individuals.

With regard to social relations, Holland (1992) makes two predictions related to the characterization of social relations of various Holland types of individuals. First, Social and Enterprising types will participate more in social activities and assume more frequently

leadership positions in social affairs than will other types (p. 32). Second, Holland type is related to competence in social relations such that Social types are the most skilled socially, followed, in order, by Enterprising, Artistic, Investigative, Conventional, and Realistic (p. 32). These predictions present a rather bleak picture interpersonally for the task oriented types (Investigative, Realistic, and Conventional) of being uninterested in social relations and relatively incompetent when socially relations are required. The image is of the stereotypic scientist, who is socially isolated and socially incompetent. Our conceptualization is that differences among interpersonal environments of various types will be more complicated than a simple ordering on competence and density dimensions. For one thing, given the association between social skill and psychosocial adjustment, we are hesitant to imply that Investigative, Realistic, and Conventional types are less healthy mentally than the more social types.

To understand differences in social environments, we have adopted the taxonomy of social skills developed by Riggio (Riggio 1986; 1989). Based on theories of social skill and factor analytic studies, Riggio has classified social skills on two levels-- emotional and social. Within each level, skills exist in the areas of expressivity, sensitivity, and control. Expressivity refers to the ability to express oneself in communication (encoding); sensitivity refers to the ability the interpret the messages of others (decoding); and control refers to the ability to regulate one's communication in a social situation (modulation). A further description of each of the six social skills is presented in Table 1.

Insert Table 1 Here

In making predictions about the social skills of Holland types and the social environments produced by these types, we make several assumptions. First, although individual differences may exist among various types of individuals, social interaction is an important aspect of most everyone's life and that this social interaction spans the range from purely social (recreation), through familial (e.g., marriage, family relations), to task or occupational (e.g., participation in work groups, interaction with customers). For example, an academic chemist (an IR type) needs to organize and run a laboratory group, participate in faculty meetings, and teach and, as well, will likely have a family, enjoy friends, and participate in community, religious or other groups -- all of which are activities that involve social relations. Second, the pattern of social skills exhibited by different types will correspond to the preferred activities and proclivities. Social types, who solve problems through social mechanisms and value social relations and who are perceived as empathic, warm, and understanding will have a different set of skills than, say, Investigative types, who use their investigative competencies to solve problems and are perceived to be rational, reserved, and analytical.

Social types are hypothesized to solve problems through social means and therefore should possess the social skills necessary to build and maintain social support networks, to use coping strategies that involve others in those networks, and to empathize with others. The three social skills associated with these social coping strategies are emotional expressivity, emotional sensitivity, and social expressivity. As expected, one or more of these three social skills have been shown to be correlated with perceived emotional support, perceived social support, use of social support coping strategies, social network size, and empathy (Riggio, Tucker, & Coffaro, 1989; Riggio & Zimmerman, 1991). Therefore we

predicted that the person oriented Holland types (A, S, & E) would have greater skills in the area of emotional expressivity, emotional sensitivity, and social expressivity than would the task oriented Holland types (I, R, & C). Interestingly, the social skills that are hypothesized to be involved in solving problems socially have been found to be orthogonal to traditional indices of intelligence (Hall, 1984; Marlowe, 1986).

The remaining social skills, emotional control, social sensitivity, and social control, are important skills in managing aspects of interpersonal relations that do not rely on the emotional components necessary for solving problems through social mechanisms. We predicted that there would be no differences between social and task oriented individuals on these social skills.

The research reported here was designed to address two issues. First, we tested the hypothesis that differences in social skills between task oriented and people oriented types of individuals would be in specific areas. Second, we wanted to understand how task oriented people would construct social environments given relative deficit in skills related to emotional sensitivity, emotional expressivity, and social expressivity.

STUDY 1

The purpose of this study was to assess the social skills of the six Holland types.

Method

Subjects. The subjects were 113 undergraduates in psychology, education, and chemistry classes.

Instruments. Two instruments were used:

- *Strong Interest Inventory* was used to asses Holland type
- *Social Skills Inventory* was used to asses self-reported social skills in each of the six areas presented in Table 1

Procedure The two instruments were administered to the subjects in small groups.

Results

The predicted pattern of social skills was obtained, as shown in Figure to the right.

Discussion

The results of Study 1 corroborated the hypotheses that task oriented types (R, I, & C) have a social skill profile that differs from that of social types (S, E, & A) in a systematic way. Task oriented types have relative deficits in the social skills required to use social coping strategies. Specifically, task oriented types scored lower on emotional expressivity, emotional sensitivity, and social expressivity, skills that have been found to be correlated with perceived emotional support, perceived social support, use of social support coping strategies, social network size, and empathy (Riggio, Tucker, & Coffaro, 1989; Riggio & Zimmerman, 1991) but uncorrelated with general intelligence (Hall, 1984; Marlowe, 1986). No differences were found among Holland types on the remaining social skills, emotional control, social sensitivity, and social control.

STUDY 2

This qualitative project was designed to gather preliminary data related to the nature, density, and importance of social interactions in chemistry work groups. The project involved administering three paper and pencil inventories, interviewing group members, and observing interactions in group meetings and in various lab settings. The three inventories administered are described as follows:

Strong Interest Inventory (SII). The SII measures vocational interests and produces a profile based on the six Holland types (i.e., categorizes respondents into one of the six types).

Social Skills Inventory (SSI). The SSI is a self report measure of the types of social interactions with which the respondents feel comfortable.

Social Support Inventory -- Needs (SS-Needs). The SS-Needs is a measure of the need for social support in various areas of one's life.

In many respects, the results were congruent to expectations, but in other respects they raised interesting and intriguing questions. Following is a summary of the results of the inventories, interviews, and my observations of the interactions:

- As expected, the primary Holland classification (derived from the SII) of the members of the research groups was Investigative. The secondary classification for many was Realistic, although for some it was Social, Artistic, or Conventional.
- Generally, the expressed need for support in their life from others (as reported in the SS-Needs) was varied and similar to the general population (i.e., some expressed below average need for social support and some expressed above

average need).

- With regard to relative interest in various facets of social interactions, the members expressed (on the SSI) below average scores in the areas of emotional expressivity, and social expressivity.
- Contrary to the commonly held conception of scientists primarily focusing on tasks while ignoring social interactions, the density of the social interactions in the research groups was high. Time was spent discussing substantive scientific issues (i.e., conversation focused on a chemistry problem), equipment and other procedural topics, and purely social topics (e.g., favorite restaurants, sports, arranging social activities). Moreover, group members indicated that these social interactions were an important part of their professional development (i.e., improved the quality of their science) and of their personal satisfaction with their scientific work. Conflictual situations attenuated their ability to complete tasks and decreased enjoyment of their work. Finally, many of the graduate students indicated that they chose their current group to a large extent because they anticipated that the quality of the interpersonal interactions in the group would be positive.
- The inevitable interpersonal conflicts that are generated in groups with relatively dense interpersonal interactions were solved efficiently by focusing on tasks. For example, conflicts over the use of equipment were resolved by getting additional equipment, by making scheduled use of equipment clear, or by providing training on the proper use of equipment.

The general sense of these preliminary data is that the chemists studied are clearly

fascinated with their work and derive satisfaction from thinking about and conducting experiments in chemistry. Although they feel relatively uncomfortable with several aspects of interpersonal interactions and express varied need for social support, group members interacted often and these social interactions were important to the scientific endeavor and to the personal satisfaction of the members. Because the members were task rather than people oriented, interpersonal problems are solved by focusing on tasks.

Many lay people have the conception of scientists as social isolates with few social skills and relatively little interest or need to interact socially. Clearly, this stereotype poorly described the members of the two chemistry groups. Rather a picture could be painted of efficient groups whose members were task oriented but who interacted often and derived much satisfaction from those interactions.

Discussion

Although the manner in which social interactions were managed in these two groups were efficient and effective, there are some implications worth contemplating. Because the group members were hesitant to express or to be sensitive to emotion and solved problems by focusing on task, the nature of the interpersonal interactions are different than what would be expected in environments populated by Social types. Social types, who are emotionally expressive and value interpersonal warmth and understanding, might find the task oriented social interactions in chemistry to be discomfiting. This difference in social interactions would imply that Social types would probably not choose a major or a career in chemistry even if they had the ability to succeed and the interest in chemistry.

The groups I studied have learned to solve problems successfully through a focus on task. Solving interpersonal problems, however, by focusing primarily on tasks ignores the characteristics of people that lead to interpersonal problems. Frequently, problems occurring in group situations are caused by the interpersonal style of one or two members of the group. Rearranging equipment, changing schedules, moving lab spaces, and other task solutions, while efficiently solving the immediate problem, do not focus on interpersonal style issues. Unfortunately, similar problems with the same people are bound to reoccur because people with bothersome interpersonal styles tend to have difficulty getting along generally. Although there are personal characteristics that are difficult to change, people can alter many of the aspects of their interpersonal style when problems are solved socially.

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Table 1

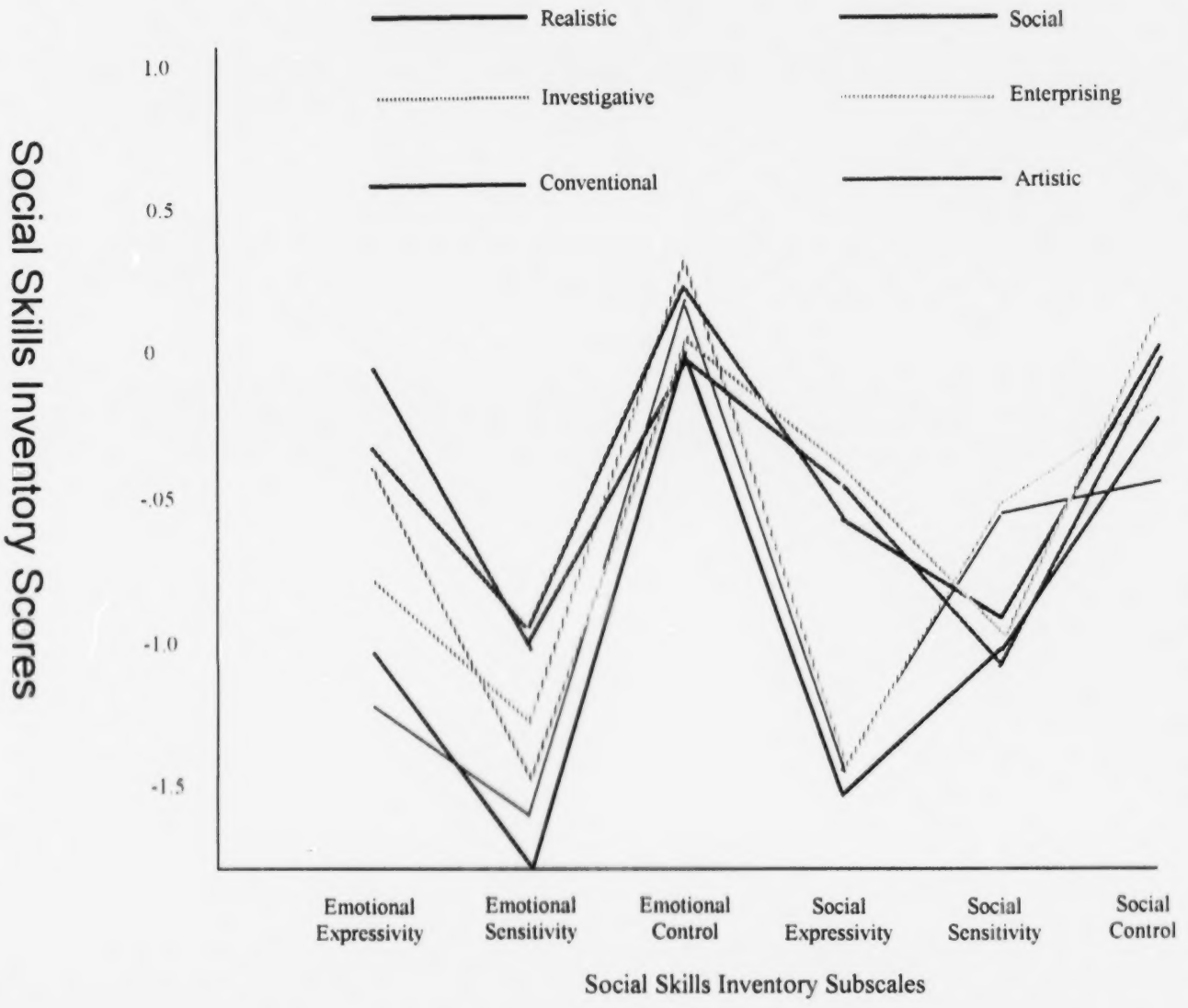
Six Areas of Social Skills

Area	Description	Representative Item From SSI
Emotional Expressivity	Measures the skill with which individuals communicate nonverbally, particularly in sending emotional messages, but also includes the nonverbal expression of attitudes, dominance, and interpersonal orientation. In addition,... reflects ability to accurately express felt emotional states.	I am able to liven up a dull party
Emotional Sensitivity	Measures skill in receiving and interpreting the nonverbal communications of others. Individuals are emotional sensitive attend to and accurately interpret the subtle emotional cues of others... are susceptible to becoming emotionally aroused by others empathically experiencing their emotional states.	I sometimes cry at sad movies

Emotional Control	Measures ability to control and regulate emotional displays. Includes the ability to convey particular emotions on cue and to hide feelings behind an assumed "mask". Persons whose scores aver very high on this scale tend to control against the display of felt emotions.	I am easily able to make myself look happy one minute and sad the next
Social Expressivity	Assesses skill in verbal express and the ability to engage others in social discourse. High scores are associated with verbal fluency in individuals who appear outgoing and gregarious and who are skilled in initiating and guiding conversations on just about any subject	When telling a story, I usually use a lot of gestures to help get the point across
Social Sensitivity	Assess ability to interpret the verbal communication of others... [and] an individual's sensitivity to and understanding of the norms governing appropriate social behavior. Persons who are socially sensitive are attentive to social behavior and are conscious and aware of the appropriateness of their own actions.	Sometimes I think that I take things other people say to me too personally
Social Control	Assess skill in role-playing and social presentation. Persons who social control skills are well developed	I am usually very good at leading group discussions

	are generally adept, tactful, and self-confident in social situations and can fit in comfortably in just about any type of social situation. Social control is also important in guiding the directions and content of communication in social interactions

Note. Descriptions and sample questions quoted from Riggio (1989), p. 2-3.


Realistic
Social
Investigative
Enterprising
Conventional
Artistic
1.0
0.5
0
-.05
-1.0
-1.5
Social Skills Inventory Scores
Emotional Expressivity
Emotional Sensitivity
Emotional Control
Social Expressivity
Social Sensitivity
Social Control
Social Skills Inventory Subscales